Bibliography of Documents and Presentations by Staff at the Environmental Science Center

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Published Books, Reports, and Articles

1. Allen, Greg. (1999). On track to quality in the lab: ISO/IEC Guide 25: the quality foundation for accreditation standards. Environmental Testing and Analysis, 8, (5), 38-40.

2. Barron, James. (1991). Volatile Organic Compounds. In US EPA Office of Drinking Water Health Advisories. Chelsea, MI: Lewis Publishers.

3. Barron, James. (1993). Guidance for the Uniform Use of Performance Evaluation Materials in the Superfund Contract Laboratory Program and Related Superfund Activities. (EPA/540-R-93-062). Washington, DC: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response.

4. Barron, James, Slayton, Joseph, & Trovato, E. Ramona. (1978). Analysis of Sulfur in Fuel Oils by Energy Dispersive X-ray Fluorescence Spectroscopy. (EPA 903/9-78-006). Philadelphia, PA: U.S. Environmental Protection Agency, Middle Atlantic Region III.

Energy dispersive x-ray fluorescence was used to analyze for sulfur in oil in commercially prepared standards, NBS standards and laboratory samples. The technique of energy dispersive x-ray fluorescence for sulfur was found to be accurate, precise, and required minimal sample preparation. In addition it was non-destructive, and enabled the simultaneous determination of sulfur and its interfering elements: phosphorus; zinc; barium; calcium; and chlorine.

5. Bhadra, Amal K. (2000). Lab study shows ASTM method D3731 produces inaccurate data. Water Environment Laboratory Solutions, 7, (7), 5-8.

6. Clark, Leo J. (1969). Mine Drainage in the North Branch Potomac River Basin (Technical Report 13). Washington, D.C. : Federal Water Pollution Control Administration, Middle Atlantic Region, Chesapeake Technical Support Laboratory.

7. Clark, Leo J. (1972). Mathematical Model Studies of Water Quality in the Potomac Estuary (Technical Report 33). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

8. Clark, Leo J., Ambrose, Jr., R.B., & Crain., R.C. (1978). Water Quality Modeling Study of the Delaware Estuary (EPA/903/9-78/001; Technical Report 62). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

Recent data acquisition, analysis, and mathematical modeling studies were undertaken to improve the understanding of water quality interactions, particularly as they impact DO, in the Delaware Estuary. The major processes treated in this study were the advection and dispersion of salinity and dye tracers, nitrification, carbonaceous oxidation, sediment oxygen demand, reaeration, algal photosynthesis and respiration, and denitrification. The major product of this

study is a calibrated and verified 'real time' hydraulic and water quality model of the Delaware Estuary between Trenton and Liston Point.

9. Clark, Leo J., Ambrose, Jr., R.B., & Roesch, S.E. (1980). User's Manual for the Dynamic (Delaware) Estuary Model. (EPA 903/9-80-001; Technical Report 64). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

This report discusses the basic principles and theories underlying the Dynamic Delaware Estuary Model. A description of the water quality interactions modeled in the Delaware are also presented. Being a User's Manual, this report also contains listings of the hydraulic and water quality models, a detailed description of each program and its logical structure, variable definitions, data deck sequences, and sample input/output.

10. Clark, Leo J., Donnelly, D.K., & Villa, O. (1973). Summary and Conclusions from the Forthcoming Technical Report 56 : "Nutrient Enrichment and Control Requirements in the Upper Chesapeake Bay" (EPA-903/9-73-002-a). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

11. Clark, Leo J., Guide, V., & Pheiffer, T. H. (1974). Summary and Conclusions: Nutrient Transport and Accountability in the Lower Susquehanna River Basin (EPA/903/9-74-014;Technical Report 60). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

Identification of the Susquehanna River as the primary contributor of nutrients to the upper Chesapeake Bay and recognition of the need to develop a nutrient management program for their mutual protection, prompted the Annapolis Field Office, EPA, to conduct a one-year comprehensive nutrient survey in the lower Susquehanna River Basin between Northumberland, PA., and Conowingo, MD. Three distinct hydrologic seasons were represented during the study period which provided the foundation for an in-depth evaluation of all water quality data obtained during this survey. Its principal objectives were: (1) Quantitative identification of average nitrogen and phosphorus loadings and determination of seasonal variations in nutrient loadings from every major sub-basin; (2) delineation of point source and non-point source nutrient contributions to establish effectiveness of controllability measure; (3) seasonal mass balance of nutrient loadings in the main stem; and (4) determination of the fate of nutrients in impounded areas.

12. Clark, Leo J. & Jaworski, N. A. (1970). Physical Data, Potomac River Tidal System, Including Mathematical Model Segmentation (Technical Report). Washington, D.C.: Federal Water Quality Administration, Middle Atlantic Region, Chesapeake Technical Support Laboratory.

13. Clark, Leo J. & Jaworski, N.A. (1972). Nutrient Transport and Dissolved Oxygen Budget Studies in the Potomac Estuary (Technical Report 37). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

14. Clark, Leo J., Jaworski, N.A., & Aalto, J.A. (1969). Upper Potomac River Basin Water Quality Assessment. Washington, D.C. : Federal Water Pollution Control Administration, Middle Atlantic Region, Chesapeake Technical Support Laboratory.

15. Clark, Leo J., Jaworski, N. A., & Feigner, K. D. (1971). Water Resource-Water Supply Study of the Potomac Estuary (Technical Report 35). U.S. Environmental Protection Agency, Middle Atlantic Region-III, Chesapeake Technical Support Laboratory.

16. Clark, Leo J., Jaworski, N. A., & Feigner, K. D. (1979). Preliminary Analyses of the Wastewater and Assimilation Capacities of the Anacostia Tidal River System (Technical Report 39). Washington, D.C.: Federal Water Quality Administration, Middle Atlantic Region, Chesapeake Technical Support Laboratory.

17. Clark, Leo J. & Roesch, S. E. (1978). Assessment of 1977 Water Quality Conditions in the Upper Potomac Estuary (EPA/903/9-78/008). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

A multi-objective water quality monitoring program was conducted in the Potomac Estuary from July to September 1977. This program was comprised of slack water sampling, wastewater effluent sampling, and a series of special studies to further describe different facets of the dissolved oxygen budget including some algal related impacts. This report presents all of the data collected during the study along with an enumeration of the findings and conclusions that were based on a detailed analysis of this data.

18. Clark, Leo J., Roesch, S. E., & Bray., M. M. (1979). User's Manual for the Dynamic (Potomac) Estuary Model (EPA/903/9-79/001; Technical Report 63). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

The Annapolis Field Office (AFO) of the Environmental Protection Agency has been actively engaged in the mathematical modeling of the Potomac Estuary since the 1960's. During the past several years, the Potomac water quality model has undergone considerable revision and expansion. This report is the first in a series of reports documenting the Potomac modeling efforts at AFO. While the model presented in this report has been adapted to the Potomac Estuary, it is by no means unique to that body of water. This report discusses the basic principles and theories underlying the Dynamic Potomac Estuary Model. A description of the water quality interactions modeled in the Potomac are also presented.

19. Clark, Leo J., Roesch, S. E., & Bray, M. M. (1980). Assessment of 1978 Water Quality Conditions in the Upper Potomac Estuary (EPA-903/9-80-002; Special Report 16). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office.

The second successive intensive monitoring program in the Potomac Estuary was performed by the Annapolis Field Office, U.S. E.P.A., during the period of July to September, 1978. This program consisted of three distinct elements: (1) slack tide sampling over a sixty-five mile reach of the upper estuary; (2) sampling of the effluents at the eight major wastewater treatment plants

in the Washington Metropolitan Area and (3) special field and laboratory studies which addressed specific aspects of the dissolved oxygen budget for mathematical modeling purposes as well as the chronic problem of eutrophication.

20. Davis, Wayne S., Fay, L.A. & Herdendorf, C.E. (1987). Overview of USEPA/Clear Lake Erie Sediment Oxygen Demand Investigations During 1979. Journal of Great Lakes Research, 13, (4) 731-737.

21. Davis, Wayne S., Brosnan, T.M. & Sykes, R.M. (1988). Use of Benthic Oxygen Flux Measurements in Wasteload Allocation Studies. In J.J. Lichtenberg, J.A. Winter, C.I. Weber, & L. Fradkin (Eds.), Chemical and Biological Characterization of Sludges, Sediments, Dredge Spoils, and Drilling Muds, ASTM Special Technical Publication 976 (pp. 450-462). Philadelphia, PA: American Society for Testing and Materials.

22. Davis, Wayne S. & Denbow, T.J. (1988). Aquatic Sediments. Journal of the Water Pollution Control Federation, 60, (6), 1077-1088.

23. Davis, Wayne S. & Jackson, S. (1994). Meeting the goal of biological integrity in water-resource programs in the US Environmental Protection Agency. Journal of the North American Benthological Society, 13, (4), 592-597.

24. Davis, Wayne S., Stribling, J. & Snyder, B. (1996). Biological Assessment Methods, Biocriteria, and Biological Indicators: Bibliography of Selected Technical, Policy, and Regulatory Literature. (EPA 230-B-96-001). U.S. EPA Office of Policy, Planning, and Evaluation: Washington, D.C.

25. Davis, Wayne S., Stribling, J., Snyder, B. & Stoughton, C. (1996). Summary of State Biological Assessment Programs for Streams and Rivers. (EPA 230-R-96-007). U.S. EPA Office of Policy, Planning, and Evaluation: Washington, D.C.

26. Dorsey, Joseph & Polvani, Deborah. (1994). Zymate II Plus Model Robot Software Adaptation of Methods Used for Sediment Digestion. (Available at the Office of Analytical Service and Quality Assurance, 701 Mapes Rd., Fort Meade, MD).

Current EPA methods of preparing soil/sediment samples for later analysis of trace metals have been successfully adapted to the Zymark (Zymate II Plus) robot in CRL. Two different methods for the digestion of soils have been implemented: Method #200.2 and Method 3050, for both flame (orange) and furnace (pink). The accuracy and precision of these automated procedures are comparable to the results obtained by manual digestion.

27. Dreisch, Frederick. (1994, November). Sample Submission Guidelines. (4th ed.). (Available from the Office of Analytical Service and Quality Assurance, 701 Mapes Rd., Fort Meade, MD.).

As a regulatory agency, EPA makes many technical decisions based on environmental data. The Agency has continually stressed assurance that reliable analytical data be used in its decisions

and has adopted "good science" as one of its central themes. This is consistent with the Regional strategic goal of "reliance on data" (Region III Strategic Direction, Memo Date 8/19/93, S. Laskowski to All Regional Staff .) Much has been done to control data quality in the laboratory. Equally important is the sample collection and handling process which precedes laboratory analysis. Samples must be representative of the matrix being studied, must be collected using methods that will maintain sample integrity, and must be properly preserved to avoid chemical or biological changes. With that in mind, these guidelines have been prepared to assist samplers who will be submitting samples to the Central Regional Laboratory (CRL), Region III.

28. Dreisch, Frederick, Gower, Marilyn, & Munson, T.O. (1980). Survey of the Huntington and Philadelphia River Water Supplies for Purgeable Organic Contaminants. (EPA-903/9-81-003). Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

29. Dreisch, Frederick, Guide, V., Cimorelli, A., Austin, J., Jerpe, J., & Sands, C. (1986). Summary Report Kanawha Valley Ambient Air Screening Program. U.S. Environmental Protection Agency, Region III, Environmental Services Division.

30. Dreisch, Frederick, Morrow, S. & Fleck, D. (1982, June). The Chemical Inventory System: User's Guide.

31. Dreisch, Frederick, & Munson, T.O. (1983). Purge-and-trap analysis using fused silica capillary Gas Chromatography/Mass Spectrometry. Journal of Chromatographic Science, 21, pp. 111-118.

32. Gundersen, Jennifer. (2001). Separation of isomers of nonylphenol and select nonylphenol polyethoxylates by HPLC with a graphitic carbon column. Journal of Chromatography A, 914, pp. 161-166.

33. Gundersen, Jennifer, Burgess, R.M., Ryba, S.A., & Cantwell, M.G. (2001). Exploratory analysis of the effects of particulate characteristics on the variation in partitioning of non-polar organic contaminants to marine sediments. Water Research, 35, pp. 4390-4404.

34. Johnson, Pat, & Villa, Ort. (1974). Distribution of Metals in Baltimore Harbor Sediments. (Technical Report 59. EPA 903-9-74-012). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office, Region III.

35. Johnson, Pat, & Villa, Ort. (1976). Distribution of Metals in Elizabeth River Sediments. (Technical Report 61. EPA 903-9-76-023). Annapolis, MD: U.S. Environmental Protection Agency, Annapolis Field Office, Region III.

36. Kutz, Frederick W., Barnes, D.G., & Bretthauer, E.W. (1990). The international toxicity equivalency factor(I-TEF) method for estimating risks associated with exposures to complex mixtures of dioxins and related compounds. Toxicological and Environmental Chemistry, 26, 99.

37. Kutz, Frederick W., Bottimore, D.P., & Bretthauer, E.W. (1990). Accomplishments of the NATO/CCMS pilot study on international information exchange on dioxins and related compounds. Toxicological and Environmental Chemistry, 26, 111.

38. Kutz, Frederick W., Cook, B.T., & Carter-Pokras, O. D. (1992). Selected pesticide residues and metabolites in urine from a survey of the U.S. general population. Journal of Toxicology and Environmental Health, 37, 277.

39. Kutz, Frederick W. & Linthurst, R.A. (1990). A systems-level approach to environmental assessment. Toxicological and Environmental Chemistry, 28, 105.

40. Kutz, Frederick W., Maxted, J. R., & Weisberg, S. B. (1997). The ecological condition of dead-end canals of the Delaware and Maryland coastal bays. Estuaries, 20, 319.

41. Landy, Ronald, Kim, I.S., Lee Y., & Hoffman, M.K. (1999). Regulatory approaches for controlling pesticide residues in food animals. Veterinary Clinics of North America: Food Animal Practice, 15, 89-107.

Pesticide use is vital to the production of an economical, high-quality food supply throughout the world. The regulatory system in the United States is designed to prevent the entry of unacceptable residues into the food supply. To address the complexities associated with pesticide use, the regulatory apparatus is composed of several federal and numerous state agencies. Based on monitoring results, it appears that most pesticides are being used in the appropriate manner and that thresholds for pesticides, deemed to be adequate to protect human health, are seldom exceeded. With our increasing knowledge of the public health and ecological threats posed by pesticide residues, our approach to regulating pesticides will continue to evolve.

42. Landy, Ronald B., Smith, W. M., & Leschine, T. M. (1988). National Priorities in Marine Pollution. Rockville, MD: National Oceanic and Atmospheric Administration, Office of the Chief Scientist, National Ocean Pollution Program Office.

43. Landy, Ronald, Van der Schalie, W., & Menzie, C. (1993). Review of Ecological Assessment Case Studies from a Risk Assessment Perspective (EPA/630/R-92/005). Washington, D.C: U.S. Environmental Protection Agency.

Vol. 1 contains evaluations of twelve case studies based upon a series of EPA-sponsored workshops held between May 29, and June 20, 1991.

44. Pheiffer, Thomas H. (1972). Water Quality Conditions in the Chesapeake Bay System (Technical Report 55). Annapolis, MD: U.S. Environmental Protection Agency, Region III, Annapolis Field Office.

45. Pheiffer, Thomas H. (1972). Heavy Metals Analyses of Bottom Sediment in the Potomac River Estuary. Annapolis, MD: U.S. Environmental Protection Agency, Region III, Annapolis Field Office.

46. Pheiffer, Thomas H. (1974). Evaluation of Waste Load Allocations: Patuxent River Basin. Annapolis, MD: U.S. Environmental Protection Agency, Region III, Annapolis Field Office.

47. Pheiffer, Thomas H. (1975). Current Nutrient Assessment Upper Potomac Estuary. Philadelphia, PA: U.S. Environmental Protection Agency, Region III.

48. Pheiffer, Thomas H. & Lovelace., N. L. (1973). Application of Auto-Qual Modelling System to the Patuxent River Basin (EPA/903/9-74-013; Technical Report 58). Annapolis, MD: U.S. Environmental Protection Agency, Region III, Annapolis Field Office.

During the 1973 summer sampling season water quality data were collected in the Patuxent River Basin in order to calibrate and verify mathematical models for the purposes of dissolved oxygen and salinity prediction. The calibration and verification processes are described together with a presentation of the field data for further application by interested parties.

49. Pheiffer, Thomas H., Nunno, T.J., & Walters, J.S. (1990). EPA's assessment of European contaminated soil treatment techniques. Environmental Progress, 9, 79.

50. Pheiffer, Thomas H. & West, D. R. (1990). Technology transfer in the U.S. Environmental Protection Agency's Hazardous Waste Office. Journal of the Air & Waste Management Association, 40,(2) 171.

A description of the evolution of OSWER's program to transfer critically needed technologies to the field.

51. Poff, Kevin. (1993). Reregistration Eligibility Decision. Environmental Fate and Transport Assessment of N-phosphonomethyl glycine (Glyphosate). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

52. Poff, Kevin. (1994). Reregistration Eligibility Decision. Environmental Fate and Transport Assessment of 2,2-dibromo-3-nitrilopropionamide (DBNPA). (EPA/738-R-94-026). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

53. Poff, Kevin. (1995). Reregistration Eligibility Decision. Environmental Fate and Transport Assessment of 4-amino-3,5,6-trichloropicolinic acid (Picloram). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

54. Poff, Kevin. (1998). Reregistration Eligibility Decision. Environmental Fate and Transport Assessment of 3,5-dibromo-4-hydroxybenzonitrile (Bromoxynil). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

55. Poff, Kevin. (1998). Reregistration Eligibility Decision. Envrionmental Fate and Transport Assessment of 2,6-dichlorobenzonitrile (Dichlobenil). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

56. Poff, Kevin. (1998). Reregistration Eligibility Decision. Environmental Fate and Transport Assessment of 1,3-Dichloropropene (Telone). Washington, D.C. : United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Environmental Fate and Effects Division, Environmental Fate and Ground Water Branch.

57. Russell, David. (1987). Paedampharete acutiseries, a new genus and species of Ampharetidae (Polychaeta) from the North Atlantic HEBBLE area, exhibiting progenesis and broad intraspecific variation. Bulletin of the Biological Society of Washington (7), 140-151.

58. Russell, David. (1989). Three new species of Sphaerosyllis (Polychaeta: Syllidae) from mangrove habitats in Belize. Zoologica Scripta 18, 375-380.

59. Russell, David. (1989). A new species of Odontosyllis (Polychaeta: Syllidae) from Twin Cays, Belize. Proceedings of the Biological Society of Washington 102, 768-771.

60. Russell, David. (1991). Exogoninae (Polychaeta: Syllidae) from the Belizean barrier reef with a key to species of Sphaerosyllis. Journal of Natural History 25, 49-74.

61. Russell, David. (1995). Description of a new viviparous species of Dentatisyllis (Polychaeta: Syllidae) from Belize with an assessment of growth and variation, and emendation of the genus. Proceedings of the Biological Society of Washington 108, 568-576.

62. Slayton, Joseph. (1977). Carbonaceous and Nitrogenous Demand Studies of the Potomac Estuary. (EPA 903/9-79-003). Philadelphia, PA: U.S. Environmental Protection Agency, Region III.

The biochemical oxygen demand of Potomac River and STP effluent samples was determined during the summer of 1977. The fraction associated with N.O.D. was measured using an inhibitor to nitrification and the oxygen depletion was monitored during long term incubation. The average deoxygenation constants for the river sample C.B.O.D. and N.O.D. were 0.14/day k sub e. The N.O.D. was found to be a significant component of the B.O.D.5 for STP effluent and river samples. The peak C.B.O.D. was associated with an algal bloom of Oscillatoria.

63. Slayton, Joseph. (1977). Algal Nutrient Studies of the Potomac Estuary.
(EPA 903/9-79-002). Philadelphia, PA: U.S. Environmental Protection Agency, Region III.

The nutrient requirements of the phytoplankton of the Potomac Estuary were studied during the summer of 1977 employing the following laboratory tests: NH4(t)-N uptake, alkaline phosphatase enzyme activity; extractable surplus orthophosphate; tissue analysis for carbon, nitrogen and phosphorus content; and nitrogen fixation by acetylene reduction. The results

indicated that the bloom of Oscillatoria was limited by nitrogen and that adequate phosphorus was present.

64. Slayton, Joseph. (1979). Lehigh River Intensive (Kinetic Rates). (EPA 903/9-79-004). Philadelphia, PA: U.S. Environmental Protection Agency, Middle Atlantic Region III.

An intensive survey of the lower reach of the Lehigh River between Palmerton and the mouth was conducted during October 1977. The study included the water quality, hydrologic and benthic characterizations necessary for calibration and verification of a mathematical model being developed by the EPA Region III Water Planning Branch.

65. Slayton, Joseph. (1979). Biochemical Studies of the Potomac Estuary, Summer 1978. (EPA 903/9-79-005). Philadelphia, PA: U.S. Environmental Protection Agency, Middle Atlantic Region III.

The carbonaceous and nitrogenous oxygen demand of Potomac River and STP effluent samples was determined during the summer of 1978. The oxygen depletion kinetics were studied during long term incubation using an inhibitor to nitrification. The average deoxygenation constants k sub e for the river sample CBOD and NOD were 0.12/day and 0.10/day, respectively. The CBOD of the Potomac STP effluent samples followed first order kinetics with an average k sub e = .16/day. The NOD for the STP effluent samples had a significant lag time resulting in poor correlation coefficients for first order fit. The average algal contribution to the BOD5 was 0.027 mg/micrograms chlorophyll a with 70% due to decay and 30% due to respiration.

66. Slayton, Joseph. (1988). In U.S. EPA Office of Water Enforcements and Permits (Ed.), NPDES Compliance Inspection Manual. Washington, DC: U.S. Environmental Protection Agency, Office of Water Enforcements and Permits.

The National Pollutant Discharge Elimination System (NPDES) Compliance Inspection Manual has been developed to support inspection personnel in conducting field investigations fundamental to the NPDES compliance program and to provide inspectors with standardized procedures for conducting complete, accurate inspections. The information presented in the manual will guide a qualified inspector in conducting an accurate inspection. The manual presents standard procedures for inspection; it is assumed the inspector has a working knowledge of wastewater and related problems, regulations, and control technologies. The manual will serve the experienced inspector as a flexible and easy reference. New inspection personnel will find support in the orderly and detailed presentation of the material. The manual presents the most current information on NPDES compliance inspections available at the time of publication.

67. Slayton, Joseph. (1994). NPDES Self-Monitoring Data and Data Audit Inspections (DAIs). (EPA/903/R-94/043). Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

The manual summarizes the procedures for conducting a Data Audit Inspection and provides useful guidance for permit writers, state inspectors, EPA inspectors, and permittees to help assure

NPDES self-monitoring data integrity. This document also provides: checklists for regulatory and self-assessment; information on numerous data related topics, e.g., "greater than-values", "unacceptable QC"; and includes a listing of suggestions for additional data related items to be included in NPDES permits and/or the 40 CFR part 136.

68. Slayton, Joseph. (1995). EPA's Planned Performance-Based Method System. Water Environment Federation Highlights 32 (7).

69. Slayton, Joseph. (1996). The Accreditation of Environmental Laboratories in the United States. In H. Gunzler (Ed.), Accreditation and Quality Assurance in Analytical Laboratories (G. Lapitajs, Trans.). (pp. 247-260). Berlin; New York: Springer-Verlag. (Original work published 1994).

70. Slayton, Joseph. (1997). Pollution prevention. Environmental Testing & Analysis, 6 (3), 9-10.

71. Slayton, Joseph (1999). [Review of the book GC/MS:A Practical User's Guide]. Analytical Chemistry, 71, 413A-414A.

72. Slayton, Joseph, & Edwards, Jan. (1996). Record Audits for Drinking Water Laboratories. (Appendix H). In U.S. EPA Office of Ground Water and Drinking Water (Ed.), Manual for the Certification of Laboratories Analyzing Drinking Water: Criteria and Procedures Quality Assurance. (4th ed.). (EPA 815-B-97-001). Cincinnati, OH: U.S. Environmental Protection Agency, Office of Water.

This Appendix provides information on the records which drinking water laboratories should maintain. It is intended to assist the certification officer in conducting data audits for drinking water laboratories.

73. Slayton, Joseph & Warner, Susan. (1992). Surrogate and Matrix Spike Recoveries in Chlorinated Samples Using Sodium Thiosulfate, Sodium Arsenite and L-Ascorbic Acid as Dechlorinating Agents. (EPA-903/9-89-001). Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

Chlorine reacts with various organics in environmental samples to produce undesirable artifacts. These artifacts can cause false positives to be reported, and other compounds actually present to be reported as not detected. The NPDES method (EPA Method 625) for base/neutral and acid compounds states that residual chlorine should be determined in the field. Effluents must be dechlorinated before acidification to prevent the chlorination of compounds present in the effluent. The study examined the suitability of three dechlorinating agents: sodium thiosulfate, L-ascorbic acid and sodium arsenite. The three dechlorinating reagents were also tested using the separatory funnel technique. The authors are currently using continuous extraction as the routine method of extraction for water samples. This method has been found to generally produce higher recoveries of all compounds when compared to separatory funnel extraction. The higher recoveries are due to the fact that the

extraction solvent is constantly being re-distilled. This essentially results in numerous, repeated extractions using fresh solvent for each extraction.

74. Slayton, Joseph, Warner, Susan, Shreiner, Phillip, Tulip, Carole & Messer, Edward. (1993). Solvent Minimization in the Continuous Liquid/Liquid Extraction of Aqueous Samples for Semivolatile Organics. (EPA /903/R-93/003). Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

Continuous extraction (CE) of aqueous samples is quickly replacing separatory funnel extraction for semivolatile organics. The advantages of continuous liquid/liquid extraction over separatory funnel extractions include the following: improved extraction efficiencies and accuracy due to the increased number of theoretical plates associated with the re-distilled solvent being continuously exposed to the sample; savings in manpower due to the reduction of both time and physical labor; the effectiveness of the CE technique in highly contaminated matrices containing suspended solids (a problem with Solid Phase Extractions); the effective elimination of emulsions common with separatory funnel extractions of environmental samples; and the improved precision using CE. One disadvantage of the traditional CE procedure is the considerable volume of solvent. Given the overall expense of using methylene chloride, both the initial purchase cost and the extremely costly disposal fee, it would be desirable to miniaturize the procedure in order to minimize the volume of solvent. A design for a miniaturized continuous extractor was developed so as to maintain the sensitivity of the procedure, yet minimize the solvent necessary to perform the analysis. A series of extraction recovery experiments were performed using the prototype extractor design.

75. Tulip, Carol, Slayton, Joseph, Warner, Susan, & Shreiner, Phillip. (1996). Comparative Performance of Continuous Liquid/Liquid Extractor Designs. (EPA/903/R-96/016). Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

In this study, a series of extraction recovery experiments were performed using the Corning design to determine: the effect of the various extraction variables (temperature, etc.) and the necessity for design modifications and/or changes to extraction protocols required to improve target compound recoveries and ruggedness of the procedure; recovery of semivolatile organics, pesticides and PCBs listed as target compounds under the Superfund Contract Laboratory Program, EPA methods 608 (Pesticides and PCBS) and 625 (NPDES) and 508 (SDWA); ease and practicality of use; consistency with the Agency's mandatory analytical procedures; effectiveness of the extractor in recovering solvent and in performing the K-D concentration; and comparison with the performance of the 'mini' continuous extractor.

76. Turner, K. Arnold, Mason, R.P. & Baker, J.E. (1999). The Influence of Varying Algal Biomass on Contaminant Exposure in Benthic-Planktonic Mesocosms: Copper (II). Chemistry and Ecology, 16, 317-340.

77. Warner, Susan, Tulip, Carole, Shreiner, Phillip, & Slayton, Joseph. (1993). Supercritical Fluid Extraction of Organic Compounds from Various Solid Matrices. (EPA /903/R-93/004). Annapolis, MD: U.S. Environmental Protection Agency, Central

Regional Laboratory.

The analysis of soil and sediment samples are routinely performed using either Soxhlet extraction or sonication. Both procedures use large quantities of organic solvents such as methylene chloride, hexane and acetone. These solvents are expensive to purchase and dispose of properly. In addition, these procedures are time-consuming and tedious. Supercritical fluid extraction (SFE) is rapid and uses very little solvent. The supercritical fluid used in these experiments is non-toxic and does not create problems with hazardous waste generation and disposal. This work was part of a general effort by the US EPA Central Regional Laboratory in Region III to minimize the solvent necessary for extraction of semi-volatile compounds. The goal of the study was to determine optimal extraction conditions (pressure, flow, temperature, time and use of modifiers) for the extraction of semi-volatile compounds.

78. Weisberg, Charles & Altman, Ronald. (1990). The Investigation of Aluminates in the Choptank River. Annapolis, MD: U.S. Environmental Protection Agency, Central Regional Laboratory.

The concentration of labile aluminum at two locations on the Choptank River was determined over two sampling seasons (1988-1989) by cation-exchange chromatography in combination with graphite furnace atomic absorption spectrophotometry, and by ion chromatographic spectrophotometry. Concentration levels of aluminum for split samples and split field spiked samples were compared for the two different analytical techniques; along with data collected on dissolved oxygen, sulfate, chloride, pH, alkalinity, total organic carbon levels. Concentration patterns over time for the various measured parameters were related to the total amount of rainfall in the sampling area.

79. Weisberg, Charles & Ellickson, Michael. (1998). Practical modifications to U.S. EPA Method 8330 for the analysis of explosives by high performance liquid chromatography (HPLC). American Laboratory, 30 (4), 32N-32V.

80. Wilding, Stevie. (1996). USEPA Contract Laboratory Program National Functional Guidelines for Dioxin/Furnan Data Validation. Multi-Media Multi-Concentration (DFM01.1).

Presentations and Proceedings of Conferences, Meetings, and Symposia

1. Altman, Ronald. (1992, April). Evaluation of Methods to Determine Sulphate in Water Matrices. Poster session presented before the Division of Environmental Chemistry, American Chemical Society, San Francisco, CA.

The paper evaluates the methods used to determine sulfate in reagent, drinking, and wastewater matrices. The turbidimetric, gravimetric, barium chloranilate, methylthymol blue, and ion chromatography methods are discussed. The time requirements and detection limits are tabulated for each method. The theory, operation, and legal status of each method is visually illustrated. The strengths and weaknesses of each method are also compared.

2. Barron, James. (1975, October). 1,000 Oil Spills, A Bench Chemist's Experience in EPA's Oil and Hazardous Materials Program. Presented at the Second National Meeting of the Federation of Analytical and Spectroscopic Societies, Indianapolis, IN.

3. Barron, James. (1976, April). Identification of Oil Spills by Mass Spectrometry. Presented at the Mid-Atlantic Forensic Scientists Meeting, Williamsburg, VA.

4. Barron, James. (1976, May). Technical and Legal Problems in the Treatment and Disposal of Water Soluble and Invert Emulsion Type Hydraulic Fluids. Presented at the National Meeting of the Society of Lubricating Engineers, Philadelphia, PA.

5. Barron, James. (1976, October). Treatment and Disposal of Water-Based Hydraulic Fluids. Presented at the Second Annual BASF Symposium on Water-Glycol Fluids, Detroit, MI.

6. Barron, James. (1977, September). A Rapid Method for the Identification of Underground Gasoline Leaks, for Laboratories Servicing State Fire Marshall's Offices. Presented at the Mid-Atlantic Forensic Scientists Meeting, Annapolis, MD.

7. Barron, James. (1989). Laboratory Performance with New Methods for Analysis of Organic Compounds in Drinking Water. In Proceedings of the Twelfth Annual Conference on Analysis of Pollutants in the Environment. Washington, DC: U.S. Environmental Protection Agency, Office of Water.

8. Barron, James. (1991, March). Current Quality Assurance Issues for the Contract Laboratory Program. Presented at the Superfund Analytical Services Caucus, San Diego, CA.

9. Barron, James. (1993). Current Trends and Uses of Performance Evaluation Materials in the Superfund Contract Laboratory Program. In Proceedings of the Ninth Annual Waste Testing & Quality Assurance Symposium (pp. 1-10). Washington, DC: U.S. Environmental Protection Agency.

This presentation discusses trends in the use of Performance Evaluation Materials (PEM's) in

environmental work and the approaches taken by the Analytical Operations Branch of the Hazardous Site Evaluation Division.

10. Barron, James. (1995). Non-Phthalate Plasticizers in Environmental Samples. In Proceedings of the Eleventh Annual Waste Testing and Quality Assurance Symposium (pp. 219-227). Washington, DC: U.S. Environmental Protection Agency.

Phthalate plasticizers are on all EPA "lists." However only drinking water regulates a non-phthalate plasticizer, bis(2-ethylhexyl) Adipate. In a recent water quality monitoring project on the Chester River, in Maryland, we had authentic standards previously obtained from a former plasticizer manufacturer on the Chester River by the Md. Dept. of Natural Resources. These materials included both phthalate and non-phthalate plasticizers. The non-phthalates included adipates, maleates, a sebacate, a benzoate, and a trimelliate. All the materials were a technical grade, containing the various isomers of that material. One of the adipates manufactured at the Chester River site, di-octyl adipate, is one of the compounds on the original consent decree list. One of its isomers, di(ethylhexyl) adipate is a drinking water analyte. We were examining river sediments at low ppb levels. Most of the plasticizers supplied were "non-target compounds." Our results indicated both phthalate and non-phthalate plasticizers were present in the samples. We feel the results show non-phthalate plasticizers have been used, typical applications being in lubricants, coatings and low temperature applications for plastics, particularly polyvinyl chloride formulations.

11. Barron, James, & Austin, J.J. (1986, September). Detection and Monitoring of Nitrogen Containing Herbicides and Insecticides at the Parts per Trillion Level in the Upper Chesapeake Bay. Presented at the Twentieth Mid-Atlantic ACS Meeting, Baltimore, MD.

12. Barron, James, & Munson, T.O. (1978, April). Discovery of a Source of Carbon Tetrachloride in Public Drinking Water. Presented at the Twelfth Mid-Atlantic ACS Meeting, Hunt Valley, MD.

13. Barron, James, Munson, T.O., & Austin, J. (1978, April). GC/MS/DS Analysis of Organic Chemicals Entering Ground Water from a Landfill. Presented at the Twelfth MARM of the ACS, Hunt Valley, MD.

14. Barron, James, & Raspberry, A.D. (1970, October). Correlation of Spectrometric Oil Analysis with Actual Teardown Data. Presented at the Ninth National Meeting of the Society for Applied Spectroscopy, New Orleans, LA.

15. Barron, James & Robertson, Gary. (1994). An Evaluation of Gas Chromatography/Ion Trap Mass Spectrometry for Analysis of Environmental Organochlorine Pesticides. In Proceedings of the Tenth Annual Waste Testing & Quality Assurance Symposium (pp. 475). Washington, DC: US Environmental Protection Agency.

The U.S. EPA is continually making efforts to improve the quality of analytical data and supporting documentation used for making decisions about environmental contamination. A

research project evaluating the use of Gas Chromatography/Ion Trap Mass Spectrometry (GC/ITMS) for the analysis of organochlorine pesticides is being conducted by the Environmental Monitoring Systems Laboratory-Las Vegas and the Analytical Operations Branch of the Office of Solid Waste and Emergency Response. The research has concentrated on the CLP list of organochlorine pesticides. Results of these studies, which show GC/ITMS to be a promising technique, will be discussed, and a comparison will be made to current CLP quantitation limits. Planned additional research will also be discussed.

16. Barron, James, Weisberg, Charles, & Foreman, Fredrick. (1997). Experience of the EPA Region III Regional Laboratory in Using Fixed Laboratory Equipment as Transportable Analytical Systems. In Field Analytical Methods for Hazardous Wastes and Toxic Chemicals (pp. 727-740).Las Vegas: Air & Waste Management Association.

An environmental laboratory such as the Region III laboratory cannot afford separate fixed laboratory and field analytical equipment. However, due to continually occurring high visibility environmental emergencies and waste site discoveries, it must have state of the art field analytical capability. This presentation discusses Region III's experience in making stationary laboratory equipment transportable, up to and including Gas Chromatographic/Mass Spectrometry systems, as an economical and efficient alternative.

17. Barron, James, & Wright, B.M. (1978). The Use of GC/Mass Spectrometry in Settling High Volume, High Cost Oil Spills by Non-Judicial Means. In Proceedings of the 29th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy. Pittsburgh, PA: Pittsburgh Conference.

18. Costas, Robin, & Warner, Susan. (1998, October). Presentation to water quality personnel in Bangkok, Thailand.

Presentation included guidelines for sample handling, laboratory information management systems, analytical methods and support equipment, quality control requirements, metals analysis, data reduction, validation, and reporting, laboratory safety, hazardous and non-hazardous waste management, and pollution prevention.

19. Fritsche, Norman. (1991, February). Laboratory Environmental Compliance Course. Presented at the State Laboratory Director's Meeting, Annapolis, MD.

The thirteen hour course covered topics from lab generation of RCRA regulated wastes to classification, labeling, packing, and disposal of these wastes.

20. Krantz, Pat. (1988, June). QA Orientation for ARCS Contractors. Seminar for Regional Contractors and Region III QA and CLP Requirements, Annapolis, MD. (Instructor).

21. Krantz, Pat. (1988, June). Region III QA and CLP Requirements. Presented at the Regional and State Pre-Remedial Conference, Philadelphia. PA. (Invited Speaker).

22. Krantz, Pat. (1988, July). Laboratory QA and Data Validation. Presented at the OSWER Solid Waste Symposium, Washington, DC. (Instructor).

23. Krantz, Pat. (1989, April). Basic Elements of a QA Program. Presented for the Commonwealth of Virginia, DCLS, Richmond, VA. (Speaker).

24. Krantz, Pat. (1990, February). DQOs and PARCC. Presented at the QAPjP Training Course for States and Contractors, Annapolis, MD. (Instructor).

25. Krantz, Pat. (1990, July). Unit Three: Chapter One Requirement. RCRA QA Workshop, Presented at the OSWER Symposium, Washington, DC. (Instructor).

26. Krantz, Pat. (1990, October). EPA's Perspectives on QA. Presented for the Virginia Water Pollution Control Association, Conference on QA and QC for Wastewater Laboratory, Lorton, VA. (Invited Speaker).

27. Krantz, Pat. (1990, November). The Basics of Data Quality Objectives. Presented for Artesian Laboratories, Wilmington, DE. (Speaker).

28. Krantz, Pat. (1991, April). QA and EPA Regulations. Presented at the Maryland Department of Health and Mental Hygiene for State Lab and Program Personnel, Baltimore, MD. (Speaker).

29. Krantz, Pat. (1991, July). Module II: Quality Assurance Requirements of Chapter One of SW-846. RCRA Quality Assurance Workshop, presented at the Office of Solid Waste and Emergency Response (OSWER) Symposium, Washington, DC. (Invited Speaker).

30. Krantz, Pat. (1991, December). QA Seminar. Presented for consulting staff of EPA Engineering, Science and Technology, Inc., Baltimore, MD. (Invited Speaker).

31. Krantz, Pat. (1992, April). TQM Presentation. Presented for Region III State Lab Managers at the Central Regional Laboratory, Annapolis, MD. (Speaker).

32. Krantz, Pat. (1992, June). Hoshin Workshop. Presented for the Superfund Pennsylvania Remedial Branch, Philadelphia, PA. (Facilitator).

33. Krantz, Pat. (1992, June). Total Quality Management. Presentation for Virginia DCLS Laboratory Managers, Richmond, VA. (Invited Speaker).

34. Krantz, Pat. (1992, July). Visionary Leadership. Presented at the Central Regional Laboratory for Managers and Supervisors, Annapolis, MD. (Facilitator).

35. Krantz, Pat. (1992, December). Seven Habits of Highly Effective People. Presented for Central Regional Laboratory and Quality Assurance Staff, Annapolis, MD. (Facilitator).

36. Krantz, Pat. (1993, April). Seven Habits of Highly Effective People. Presented for Water Division Managers, Philadelphia, PA. (Facilitator).

37. Krantz, Pat. (1993, June). Seven Habits of Highly Effective People. Presented for the EPA Office of Radiation and Indoor Air, Washington, DC. (Facilitator).

38. Krantz, Pat. (1993, September). Swamped: A Survival Exercise. Presented for EPA Central Regional Staff, Annapolis, MD. (Facilitator).

39. Krantz, Pat. (1994, January). Seven Habits for Highly Effective People. Presented for EPA Regional Staff, Philadelphia, PA. (Facilitator).

40. Krantz, Pat. (1994, January). Seven Habits of Highly Effective People. Presented for EPA Central Regional Laboratory Staff, Annapolis, MD. (Facilitator).

41. Krantz, Pat. (1994, March). ODI Basic TQ. Presented for EPA Region III Human Resources Branch, Philadelphia, PA. (Facilitator).

42. Krantz, Pat. (1994, April/May). Goal Setting Workshops. Presented for EPA Quality Assurance Branch Staff, Annapolis, MD. (Designer/Instructor).

43. Krantz, Pat. (1994, May). Seven Habits of Highly Effective People. Presented for EPA Regional Staff, Philadelphia, PA. (Facilitator).

44. Krantz, Pat. (1994, June). TQ Overview. Presented for EPA Central Regional Laboratory Staff, Region III, Annapolis, MD. (Facilitator).

45. Krantz, Pat. (1994, August). Self-Directed Work Teams: A Briefing. Presented for Region III EPA Office of External Affairs, Philadelphia, PA. (Invited Speaker).

46. Krantz, Pat. (1994, December). Seven Habits of Highly Effective People. Presented for EPA Region III Staff, Philadelphia, PA. (Facilitator.)

47. Krantz, Pat. (1995, February). Myers-Briggs: Introduction to Type. Presented at the workshop for EPA Region III, Central Regional Laboratory, Annapolis, MD. (Facilitator).

48. Krantz, Pat. (1995, March). Building a Foundation of Trust. Series of ZengerMiller Teams Training Units for EPA CRL Leadership Coordinators, Annapolis, MD. (Facilitator).

49. Krantz, Pat. (1995, March). Launching and Refueling Your Team: Tools and Techniques. Series of ZengerMiller Teams Training Units for EPA CRL Leadership Coordinators, Annapolis, MD. (Facilitator).

50. Krantz, Pat. (1995, April). The Basic Principles of Teamwork. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team

Members, Annapolis, MD. (Facilitator).

51. Krantz, Pat. (1995, April). Helping Your Team Reach Consensus. Series of ZengerMiller Teams Training Units for EPA CRL Leadership Coordinators, Annapolis, MD. (Facilitator).

52. Krantz, Pat. (1995, April). Making the Most of Team Differences. Series of ZengerMiller Teams Training Units for EPA CRL Leadership Coordinators, Annapolis, MD. (Facilitator).

53. Krantz, Pat. (1995, April). Myers-Briggs : Using Type in Organizations and Teams, Group Dynamics. Presented at the workshop for EPA Region III, Central Regional Laboratory, Annapolis, MD. (Facilitator).

54. Krantz, Pat. (1995, May). Keeping Your Team on Course: Tools and Techniques. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team Members, Annapolis, MD. (Facilitator).

55. Krantz, Pat. (1995, May). Playing a Vital Role in Team Decisions. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team Members, Annapolis, MD. (Facilitator).

56. Krantz, Pat. (1995, May). Work Teams at CRL: A Briefing. Presented before the EPA Office of Air and Radiation, Stratospheric Protection Division, Washington, DC.

57. Krantz, Pat. (1995, June). Developing Team Plans. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team Members, Annapolis, MD. (Facilitator).

58. Krantz, Pat. (1995, June). Expanding Your Teams's Capabilities. Series of ZengerMiller Teams Training Units for EPA CRL Leadership Coordinators, Annapolis, MD. (Facilitator).

59. Krantz, Pat. (1995, July). Raising Difficult Issues with Your Team. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team Members, Annapolis, MD. (Facilitator).

60. Krantz, Pat. (1995, August). Clarifying Customer Expectations. Series of ZengerMiller Teams and Training Units for EPA Central Regional Laboratory Leadership Coordinators and Team Members, Annapolis, MD. (Facilitator).

61. Landy, Ronald B., Holm, S. E., & Conner, W. G. (1986). Interagency Workshop on Aquatic Monitoring and Analysis for Organotin Compounds. Rockville, MD: National Oceanic and Atmospheric Administration.

62. Russell, David. (1984, December). Intraspecific variation and paedomorphosis in an abyssal ampharetid polychaete from the North Atlantic. Paper presented to the American Society of Zoologists, Denver, CO.

63. Russell, David. (1986, August). The distribution of Syllidae (Annelida: Polychaeta) in a Belizean barrier-reef mangrove system. Paper presented at the Second International Polychaete Conference, University of Copenhagen, Copenhagen, Denmark.

64. Russell, David. (1989, August). A new viviparous species of Dentatisyllis Perkins (Syllidae) from the Belizean Barrier Reef. Paper presented at the Third International Polychaete Conference, California State University, Long Beach, CA.

65. Russell, David. (1992, August). Comparison of groundwater and surface water meiobenthic communities [Wye River, Maryland]. Paper presented at the Eighth International Meiobenthic Conference, University of Maryland, College Park, MD.

66. Russell, David. (1995, January). Growth and morphological variation in a new viviparous species of *Dentatisyllis* (Polychaeta: Syllidae). Paper presented to the American Society of Zoologists, St. Louis, MO.

67. Russell, David. (1995, November). The diel vertical migration of *Marenzelleria viridis* (Polychaeta: Spionidae) in the Chester River, a tributary of the Chesapeake Bay. Paper presented at the Estuarine Research Foundation Biennial Meeting, Corpus Christi, TX.

68. Russell, David. (1995, December). Nocturnal swimming of *Marenzelleria viridis* (Polychaeta: Spionidae) in the Chester River. Paper presented at the Annual Society of Zoologists Annual Meeting, Washington, D.C.

69. Russell, David. (1997, May). New analytical capabilities in biology at the Office of Analytical Services and Quality Assurance, U.S. EPA, Region III. Paper presented at the Annual Meeting of the EPA Biological Advisory Committee, Pensacola, FL.

70. Russell, David, Locker, Rick, Harmon, Amy & Rawson, Dave. (1994, November). Polynuclear aromatic hydrocarbons in bivalves of the Chester River. Paper presented to the Atlantic Estuarine Research Society, Ocean City, MD.

71. Russell, David, Morris, C.T., & Mountford, N.K. (1989, April). New records and notes on variability of macrobenthos from the Virginian Province. Paper presented to the Estuarine Research Society, Duke University Marine Laboratory, Beaufort, NC.

72. Sims, Diann. (1995). Region III Innovative Data Validation Approaches. In HMCRI Superfund Symposium Proceedings.

73. Sims, Diann & Ketkar, Koumoudi. (1992). Automated Data Review. In P. Segato & S. Walker (Eds.), Proceedings of the HMC/Superfund 1992 HMCRI's 13th Annual National Conference & Exhibition, SARA, RCRA, HSWA, CAA, CWA (pp. 242-244). Greenbelt, MD: Hazardous Materials Control Research Institute.

Since 1980 under the Superfund contract, Contract Laboratory Program (CLP) laboratories have

analyzed thousands of samples for organic and inorganic pollutants and have generated millions of pages of data. In addition to the problems caused by the sheer volume of paper, the data are stored in region- or site-specific files, creating a problem for the U.S. EPA in accessing individual sampling results and analyzing national and regional trends. Currently, all data received from the CLP laboratories are validated in full accordance with the U.S. EPA's *National Functional Guidelines for Organic and Inorganic Data Review*, modified by and for each U.S. EPA region. This standard and time proven approach to data validation has benefits and drawbacks. The benefit is that all data are fully and uniformly validated so that unreliable data are not used inadvertently in decision-making. The most significant disadvantage is that data validation is expensive and time-consuming. Typically, data validation takes three months from the date of sampling. This situation prompted us to look at automated means of data review that could be more accurate, quicker, and cheaper.

74. Sims-Dwight, Diann, & Zawodny, Peggy. (1992). Use of Performance Evaluation Samples in Assessing Environmental Data Quality. In Proceedings of the 8th Annual Waste Testing & Quality Assurance Symposium (pp. 283-286). Washington, DC: US Environmental Protection Agency.

Performance evaluation (PE) samples have been historically employed to assess laboratory proficiency and to validate analytical methods. Periodic use as part of a laboratory quality assurance program provides indicators of analytical performance and analyst proficiency. The PE sample is also used as a component of certification and accreditation programs. Based on study results that are summarized in this paper, results of matrix specific PE samples submitted and analyzed with environmental samples can indicate systematic error that is not apparent in routine precision and accuracy measurements. Example cases will be presented to demonstrate the effectiveness of PE samples as an external quality assessment tool. The cases will show that PE sample results can be evaluated with respect to a specific sample batch and the PE sample data are effective when used to diagnose and verify the analytical performance and capability demonstrated with a given sample batch. This substantiates that the data quality achieved satisfies data quality requirements.

75. Slayton, Joseph. (1980). Simplified Nitrogenous Oxygen Demand Determination. In Purdue University School of Engineering (Ed.), Proceedings of the 34th Industrial Waste Conference. Ann Arbor: Ann Arbor Science.

76. Slayton, Joseph. (1981). The Presence of Gaseous Halocarbons in Landfill Leachates. Presented to the ACS Central Atlantic Region.

77. Slayton, Joseph. (1986). Acid/Neutral Continuous Liquid/Liquid Extraction of Priority Pollutants and Hazardous Substance List Compounds. In Environmental and Energy Study Institution (Ed.), Conference on Groundwater Quality Protection Policies for the Rocky Mountain Region and the Nation. Fort Collins, CO: Colorado Water Resources Research Institute.

78. Slayton, Joseph. (1988, February). 1979-1988 NPDES Laboratory Performance Audit Inspections (USEPA-Region III). Presented at the Pittsburgh Conference and Exposition on Analytical Chemistry and Applied Spectroscopy, New Orleans, LA.

79. Slayton, Joseph. (1993, February). Laboratory P2. Presented at the Laboratory Environmental Compliance Workshop, Annapolis, MD.

80. Slayton, Joseph. (1993, March). Common Laboratory Deficiencies (NPDES). Presented at the Pennsylvania DER Inspector Workshop, State College, PA.

81. Slayton, Joseph. (1993, May). Solid Phase Extraction of Oil and Grease. Presented at the EPA Conference on Analysis of Pollutants in the Environment, Norfolk, VA.

82. Slayton, Joseph. (1993, October). NPDES QC Procedures. Presented at the Pennsylvania DER Inspector Workshop, State College, PA.

83. Slayton, Joseph. (1993, December). Challenges to Laboratory P2: EPA Regulations and Requirements. Presented at the National Academy of Science, Washington, DC.

84. Slayton, Joseph. (1994, March). Laboratory Inspections and NPDES Procedures. Presented at the Maryland DOE Inspectors Workshop, Annapolis, MD.

85. Slayton, Joseph. (1994, Spring). Quality Systems: NELAC. Presented at the Annual Maryland State Drinking Water Administrators (SDWA) Workshop, Baltimore, MD.

86. Slayton, Joseph. (1994, April). NPDES Laboratory Procedure and Laboratory Inspections. Presented at the Pennsylvania DER Inspector Workshop, Somerset, PA.

87. Slayton, Joseph. (1994, April). Data Audit Inspections. Presented at the New Jersey Inspection Workshop, Atlantic City, NJ.

88. Slayton, Joseph. (1994, April). Choosing a Contract Laboratory and Common Laboratory Deficiencies. Presented at the Pretreatment Implementation Training Forum, Myerstown, PA.

89. Slayton, Joseph. (1994, May). NPDES Inspections Course: Environmental Regulations. Presented at Executive Enterprises, Chicago, IL.

90. Slayton, Joseph. (1994, June). SEVAP Solvent Recovery. Presented at the International Conference on Laboratory Pollution Prevention, Boston, MA.

91. Slayton, Joseph. (1994, June). Organic Analysis. Presented at the Virginia Water Control Board Inspector Workshop, Richmond, VA.

92. Slayton, Joseph. (1994, June). Quality System: National Environmental Laboratory Accreditation Program. Presented at the Annual Regional ACS Symposium, Baltimore, MD.

93. Slayton, Joseph. (1994, June). Region III Laboratory P2. Presented at the Laboratory Safety and Environmental Management Conference, Alexandria, VA.

94. Slayton, Joseph. (1994, Autumn). NPDES Self-Monitoring Data and Data Audit Inspection (DAIs). Presented at the Region III State NPDES Inspector Workshop, Cacapon State Park, WV.

95. Slayton, Joseph. (1994, October). Laboratory P2: Solvents. Presented at the Pollution Prevention Workshop, Brookhaven National Laboratory, NY.

96. Slayton, Joseph. (1994, November). NPDES Laboratory Procedures and Requirements. Presented before the Water Pollution Control Association (WPCA), Pittsburgh, PA.

97. Slayton, Joseph. (1995, July). Performance-Based Measurement System (PBMS). Presented at the Symposium of the Office of Solid Waste and Emergency Response (OSWER), Washington, DC.

98. Slayton, Joseph. (1996, April). Metals Data & Data Quality Control. Presented at Pennsylvania Pre-Treatment Forum, Myerstown, PA.

99. Slayton, Joseph. (1996, May). How to Establish and Use MDLs (40 CFR). Presented before the Virginia Water Environment Association, Williamsburg, VA.

100. Slayton, Joseph. (1996, May). PBMs for Biology. Presented at the EPA Biological Advisor Council's Annual Meeting, Washington, DC.

101. Slayton, Joseph. (1996, May). Sampling of Volatile Organics. Presented at the Pennsylvania DEP Water Quality Supervisors' Workshop, State College, PA.

102. Slayton, Joseph. (1996, October). Performance Based Measurement Systems (PBMS). Presented for EPA's Program Office Associate Administrators.

103. Slayton, Joseph. (1996, October). Performance Based Measurement Systems (PBMS). Presented at ELAB (FACA Workgroup for NELAC).

104. Slayton, Joseph. (1996, November). ASE Extraction of BNAs from Soil. Presented at the ASE Special Interest Workshop.

105. Slayton, Joseph. (1996, November). QC Requirements of NELAC. Presented for Region III State Laboratory Directors and State Certification Officers and NELAP.

106. Slayton, Joseph. (1997). Water and ASE Extraction of Soils for Semi-Volatiles. Presented at Third ASE Special Interest Group Workshop.

107. Slayton, Joseph. (1997, April). Environmental Analysis Workshop. Presented in conjunction with the Maryland Department of Agriculture.

108. Slayton, Joseph. (1997, May). Analytical Update: QC for Metals--Region III Position Paper and Common Problems with Non-Conventional Parameters. Presented to the Eastern Pennsylvania Water Pollution Association.

109. Slayton, Joseph. (1997, May). NPDES Laboratory Quality Control: How Good is Your Lab? Six week course presented for the Pennsylvania Department of Environmental Protection and the Pennsylvania Water Environment Association.

110. Slayton, Joseph. (1997, August). Metals Analyses and QC Requirements. Presented to the Pennsylvania Association of Accredited Environmental Laboratories.

111. Slayton, Joseph. (1997, August). NELAC and Common Problems Associated with Non-Conventional NPDES Parameters. Presented to the Pennsylvania Association of Accredited Environmental Laboratories.

112. Slayton, Joseph. (1997, August). NELAP: Chapter 5. Presented to the National Water Environment Federation.

113. Slayton, Joseph. (1997, September). NELAC: Chapter 5: Quality Systems. Paper presented to the Virginia Water Environment Federation.

114. Slayton, Joseph. (1997, September). NELAP. Presented to Region III State Laboratory Directors and State Certification Officers.

115. Slayton, Joseph. (1997, December). EPA Laboratory Audit. Presented to the Pennsylvania Association of Accredited Environmental Labs, Split Rock, PA.

116. Slayton, Joseph. (1998, January). Quality Systems. In National Environmental Laboratory Accreditation Conference (NELAC) Third Interim Meeting (pp. 120-229). Arlington, Virginia: U.S. Environmental Protection Agency.

117. Slayton, Joseph. (1998, April). PBMS Implementation. Presented at the National QA Conference, Denver, CO.

118. Slayton, Joseph. (1998, May). QS Requirements for Microbiology. Presented to the Virginia Water Environment Federation Laboratory Practices Committee, Norfolk, VA.

119. Slayton, Joseph. (1998, May). Recognition of Accreditation Authority. Presented to NELAC, Region III State Lab Directors-SDWA CO's, Ocean City, MD.

120. Slayton, Joseph. (1998, May). QA/QC Defensible Data. Presented to the Pennsylvania Pre-Treatment Association, Myerstown, PA.

121. Slayton, Joseph. (1998, June). Aide to DMRQA Follow-up. Presented at the DMRQA Coordinator's Meeting, Harrisburg, PA.

122. Slayton, Joseph. (1998, June). Quality Control Procedures & Defensible Data. Presented at the Pennsylvania Department of Environmental Protection Inspector's Workshop, Harrisburg, PA.

123. Slayton, Joseph. (1998, July). Data Audit Inspection. Presented to the Maryland Association of Environmental Laboratories, Easton, MD.

124. Slayton, Joseph. (1998, July). QA/QC & Defensible Data. Presented to the Maryland Association of Environmental Laboratories, Easton, MD.

125. Slayton, Joseph. (1998, August). Implementation of NELAC Quality System in Your Laboratory. Presented at the PA/NY Association of Environmental Laboratories Conference, Split Rock, PA.

126. Slayton, Joseph. (1998, October). NELAC Chapter 5: Quality Systems. Presented to the Virginia Water Environment Federation, Charlottesville, VA.

127. Slayton, Joseph, (1998, December). Issues for the National Environmental Laboratory Accreditation Program. Presented to the Region III State Laboratory Directors and SDWA Certification Officers, Richmond, VA.

128. Slayton, Joseph, (1999, February). NELAC Issues and Status Updates and State Implementation. Presented to the Maryland Environmental Laboratory Association (MELA), Towson, MD.

129. Slayton, Joseph, (1999, March). PBMS: Region III Perspective. Presented at the 50th Annual Pittsburgh Conference and Exposition on Analytical Chemistry and Applied Spectroscopy, Orlando, FL.

130. Slayton, Joseph, (1999, April). QA/QC of Environmental Data. Day long workshop presented to the Eastern Pennsylvania Water Pollution Control Operators Association (EPWPCOA), Allentown, PA.

131. Slayton, Joseph, (1999, April). NELAC: How it Will Affect the NPDES & IP Programs. Presented at the 8th Annual Industrial Waste Pretreatment Forum, Myerstown, PA.

132. Slayton, Joseph, (1999, May). NELAC and PBMS an EPA Update. Presented to the SDWA State Program Directors, Rehoboth, DE.

133. Slayton, Joseph, (1999, May). NELAP and PBMS. Presented at the DOD Environmental Colloquium, Baltimore, MD.

134. Slayton, Joseph, (1999, July). State Implementation of NELAC. Presented to the Region III State Laboratory Directors and SDWA Certification Officers, Ft. Meade, MD.

135. Slayton, Joseph, (1999, July). NELAP Accreditation Issues & Status Update. Presented to the Maryland Environmental Laboratory Association, Ft. Meade, MD.

136. Slayton, Joseph, (1999, August). Preparing Your Laboratory for NELAP. One day workshop presented to the PA/NY Association of Accredited Laboratories, Monticello, NY.

137. Slayton, Joseph (1999, October). Data Audits & Performance Based Measurment Systems. Presented to the Virginia Department of Environmental Quality Workshop (VA DEQ), Virginia Beach, VA.

138. Slayton, Joseph (1999, October). NELAC, How It Will Affect the NPDES & IP Programs. Presented to the Western Pennsylvania Water Pollution Control Association's Industrial Waste Pretretment Forum, Pittsburgh, PA.

139. Slayton, Joseph (1999, November). Data Audits, Laboratory Ethics & Peer Review. Presented to the Maryland Department of Health and Mental Hygiene, Baltimore, MD.

The Office of Analytical Services and Quality Assurance (OASQA) provided a 1/2 day training session to the Maryland Department of Health and Mental Hygiene in Baltimore, Maryland on November 5, 1999. In attendance were 45 analysts, laboratory managers and SDWA laboratory inspectors. The session described the procedures for review of analytical data and for the development of an ethics program by environmental laboratories. The purpose of the presentation was to inform the analytical community of data errors (legitimate mistakes and fraudulent activities) that have been detected by EPA and State inspectors (Data Audit) and to provide information on the possible consequences of laboratory fraud, preventive measures and techniques for self-auditing and problem detection.

140. Slayton, Joseph (2000, February). Laboratory Ethics, Data Audits and Peer Review. Presented to the Delaware Department of Natural Resources & Environmental Control (DNREC), Dover, DE.

The purpose of the presentation was to inform the Delaware environmental community of the possible consequences of unethical laboratory practices (including laboratory fraud) and provide information necessary for development of a laboratory ethics program. This training stressed proactive preventive measures, but also included techniques for self-auditing and problem detection. In addition, the session shared lessons learned from data audit inspections conducted by OASQA over the last ten years. In attendance were over 80 analysts, laboratory managers, laboratory inspectors, program managers (Superfund, NPDES, and SDWA) and the regulated community (drinking water treatment and wastewater treatment plant personnel).

141. Slayton, Joseph (2000, April). Sample Submission Guidelines. Laboratory Ethics. Presented at the 9th Annual Industrial Waste Pretreatment Forum, Myerstown, PA.

OASQA provided two presentations: "Sample Submission Guidelines"; and " Laboratory Ethics", to the estimated 140 in attendance. OASQA's first presentation, "Sample Submission

Guidelines", focused on field and sampling quality control. The second presentation, "Laboratory Ethics", provided the regulated analytical community information on ethical and unethical practices in environmental laboratories and gave a basic framework for laboratories to develop a laboratory ethics program tailored to their specific needs.

142. Slayton, Joseph (2000, May). Laboratory Ethics. Presented at the 54th Annual Meeting of the Virginia Water Environment Federation (VA WEF), Roanoke, VA.

The purpose of the presentation was to inform the Virginia environmental community of the possible consequences of unethical laboratory practices (including laboratory fraud) and to provide information necessary for development of a laboratory ethics program. In addition, the session shared lessons learned from data audit inspections conducted by OASQA over the last ten years. Over fifty laboratory analysts managers and inspectors were in attendance, representing Federal, State, municipal, facility and commercial laboratories (SDWA and NPDES), and the Virginia Department of Environmental Quality (VA DEQ).

143. Slayton, Joseph (2000, July). Laboratory Ethics. Data Audits (DAI), Peer Review and Exercises. Presented at the Maryland Environmental Laboratory Association's (MELA) summer meeting, Greenbelt, MD.

The meeting focused on quality assurance policies and quality control procedures for environmental laboratories. Laboratory managers, analysts, quality assurance officers and laboratory inspectors representing thirty commercial laboratories and the Maryland Department of Environment were in attendance. The first paper, "Laboratory Ethics", detailed the consequences of unethical laboratory activities and the necessity for laboratories to develop and implement an ethics program. This presentation included the basic components of a laboratory ethics program, for example: ethics policy statement; zero tolerance policy; ethics assistance and reporting; ethics program manager; ethics training; reporting; ethics audits; disciplinary action; employee ethics agreements; ethics communication; and problem prevention techniques. The second paper, "Data Audits (DAI), Peer Review and Exercises", described an EPA inspection (DAI), which is focused on the review of analytical data submitted to State Authorities and EPA under the National Pollutant Discharge Elimination System (NPDES) of the Clean Water Act; and the Safe Drinking Water Act (SDWA). This paper focused on example findings from DAIs, including deficiencies in record keeping and analytical documentation of analytical results and included an explanation of the necessary corrective actions. In addition, this presentation described peer review procedures (data review), that laboratories should implement to help assure quality data and as a prevention technique for analytical misconduct. In partnership with the WPD, OASQA has been developing and presenting analytical training sessions throughout Region 3. Such technical meetings (MELA, etc.) provide a forum for information exchange and is consistent with OASQA's mission as a focal point for applied environmental analytical science.

144. Slayton, Joseph (2000, August). Laboratory Ethics. Presented at the 6th Annual Good Laboratory Practices Technical Conference of the Virginia Water Environment Association (VA-WEA and American (Virginia Section) Water Works Association (VA-AWWA), Charlottesville, VA.

The purpose of the presentation was to inform the Virginia environmental community of the possible consequences of unethical laboratory practices (including laboratory fraud) and provide information necessary for development of a laboratory ethics program. OASQA also served on a panel for a discussion of the National Environmental Laboratory Accreditation Program, for which the State of Virginia has draft legislation to adopt the NELAC laboratory standards within the next year. Over Two hundred and fifty laboratory analysts managers and inspectors were in attendance representing, Federal, State, municipal, facility and commercial laboratories (SDWA and NPDES) and the Virginia Department of Environmental Quality (VA DEQ).

145. Slayton, Joseph (2000, September). Laboratory Ethics. Data Audits and Peer Review. Presented to the Pennsylvania Department of Environmental Protection Bureau of Laboratories, Harrisburg, PA.

The purpose of these presentations was to inform PA DEP personnel of the possible consequences of unethical laboratory practices (including laboratory fraud) and to provide information necessary for development of a laboratory ethics program. This training stressed proactive preventive measures, but also included techniques for self-auditing and problem detection. In addition, the session shared lessons learned from laboratory assessments conducted by OASQA over the last twenty years. In attendance were over 90 analysts, laboratory managers, laboratory inspectors and program managers (NPDES, SDWA, Hazardous Waste).

146. Slayton, Joseph (2001, April). Unacceptable QC Results, So What? Presented to the 10th Annual Industrial Waste Pretreatment Forum, Myerstown, Harrisburg, PA.

The Office of Analytical Services and Quality Assurance (OASQA) participated in the 10th Annual Industrial Waste Pretreatment Forum in Myerstown, PA. The event was hosted by the Eastern Pennsylvania Water Pollution Control Operators Association, the PA Department of Environmental Protection and the EPA (Region 3, Water Protection Division). OASQA provided the presentation to the estimated 115 in attendance. The presentation focused on: field and sampling quality control; QC results that should be reported with analytical data; what unacceptable QC results mean to the data user (impact on the data quality, data usability and decision making); and the importance of communication between the laboratory and the client.

147. Slayton, Joseph (2001, May). NELAC 7 Summary. Presented to LTIG.

The Office of Analytical Services and Quality Assurance (OASQA) participated in the 2001 National Environmental Laboratory Accreditation Conference (NELAC) in Salt Lake City, Utah (5/21/01-5/25/01). Over 250 state, federal, municipal, and private sector laboratory representatives were in attendance. During this session, proposed changes to the standards that environmental laboratories must comply with in order to be accredited under this national

program were discussed, further refined, and voted upon by state and federal representatives. The scope of accreditation for NELAC includes all regulated environmental analyses, e.g., SDWA; NPDES; RCRA; CAA; CERCLA. The program "fields of testing" include: inorganic chemistry; organic chemistry; toxicity testing; microbiology; air testing, and radiochemistry. The standards are developed in compliance with the International Organization for Standardization (ISO) and include additional standards voted on by the Conference. OASQA represented Region 3 as a member of the House of Representatives in the voting and participated in the conference sessions as a member of the NELAC Board of Directors. During the conference it was announced that the EPA's Office of Research and Development had committed $500K for each of the next five years to support the NELAC effort. In addition, the conference was informed that the first group of laboratories to be accredited under the NELAC standards had been completed by 11 States (655 laboratories accredited, with an additional 300 applications pending). This effort represents a voluntary cooperative effort between the EPA and State Authorities on a monumental scale, with an ever growing record of success.

148. Slayton, Joseph (2001, August). Laboratory Ethics. Data Audit Inspections and Peer Review. Laboratory Ethics Procedures. Presented to the PA/NY Association of Accredited Environmental Laboratories, Wilkes-Barre, PA.

The Office of Analytical Services and Quality Assurance (OASQA), in support of the Water Protection Division (Victoria Binetti and David McGuigan), presented a ½ day workshop at the PA/NY Association of Accredited Environmental Laboratories conference on August 7, 2001 in Wilkes-Barre, PA. The OASQA sessions were entitled "Laboratory Ethics", "Data Audit Inspections and Peer Review", and "Laboratory Ethics Procedures". The workshop was presented in an attempt to increase the environmental laboratory community's awareness of ethics related issues. The essential components of a laboratory ethics program were described, with the explanation that these could be adapted to suit the size and complexity of various laboratories. The presentations stressed the benefits of taking a proactive approach to avoiding problem situations, but also described the relevant criminal laws and legal consequences associated with unethical and fraudulent laboratory practices. In addition, the procedures employed and documentation reviewed by the Agency and Region 3 state authorities, as part of data audit inspections, were described in detail, as were the procedures the laboratories should employ internally, e.g., peer review. In attendance were over 60 laboratory managers, Quality Assurance Officers, and analysts from commercial and facility SDWA and NPDES laboratories.

149. Slayton, Joseph (2001, August). On-Site Inspection of Superfund PRP Monitoring Procedures. Presented to the 17th Annual Waste Testing and Quality Assurance Symposium, Arlington, VA.

The Office of Analytical Services and Quality Assurance (OASQA), in support of the Hazardous Site Cleanup Division (HSCD), presented a poster session at the 17th Annual Waste Testing and Quality Assurance Symposium on August 15, 2001 in Arlington, Virginia. The OASQA session was entitled "On-Site Inspection of Superfund PRP Monitoring Procedures". The session provided a summary of a new inspection type developed from four pilot assessments conducted at the request of HSCD. The purpose of these inspections was to help ensure that the

monitoring data is of known and necessary quality to support the environmental decisions associated with the sites. These inspections verified compliance with site specific sampling and analysis plans and include a detailed review of laboratory operations, including the following: analytical methods and techniques; analytical equipment; quality control; and all associated documentation. These inspections have been announced and have encouraged partnerships with the PRPs (spirit of working together), as opposed to an atmosphere of "enforcement of policies". This approach has provided a platform for technical assistance and has helped assure the cooperation of the PRPs and prompt resolution of any findings. The benefits of the PRP on-site assessments have included: reinforcing the importance placed on data quality by EPA to the PRPs and the public; providing technical assistance to help improve PRP monitoring data quality; assuring effective EPA oversight through additional "field presence"; offering an additional means of information collection for possible "course adjustments" to site plans to reflect realities of implementation; providing a means to verify actual implementation of site Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs); affording a check on analytical accuracy (PT samples); and providing a check on the level of detail and accuracy of third party reviews. The symposium is a national event and attended by managers, Quality Assurance Officers, and analysts from federal, state, commercial, and regulated laboratories from all over the country.

150. Slayton, Joseph (2001, August). Requirements of the National Environmental Laboratory Accreditation Program. Presented to the Region III State Laboratory Directors (state and EPA) and SDWA Certification Officers (COs), Ft. Meade, MD.

The Office of Analytical Services and Quality Assurance (OASQA) hosted a joint meeting of Region III State Laboratory Directors (state and EPA) and SDWA Certification Officers (COs) at the Environmental Science Center on August 28-29, 2001. In attendance were both technical experts and senior managers from the various Region III state health and environmental laboratories, as well as the SDWA COs who inspect and certify laboratories that perform drinking water analyses throughout the Region. The purpose of this meeting was to provide a forum for the exchange of information, to learn about new analytical technologies, to foster state partnerships, and to gather information about problems the states may be having with implementation of drinking water, NPDES, and other programs. The agenda included twelve speakers addressing topics such as tools developed by OASQA to assist states with SDWA laboratory certifications; requirements of the National Environmental Laboratory Accreditation Program; Office of Ground Water/Drinking Water (OGWDW) program update on the Agency's SDWA activities/plans/directions; an overview of NPDES methods including Hg analyses (Office of Water, Headquarters); laboratory fraud; Laboratory Information Management Systems (LIMS) and automation of data processing; and the analysis of tertbutyl alcohol in drinking water and ground water.

151. Slayton, Joseph (2002, February). Laboratory Ethics and NELAC. Presented to the Chesterfield County Utilities Department, Richmond, VA.

The Office of Analytical Services and Quality Assurance (OASQA), in support of the Water Protection Division (Victoria Binetti and Lorraine Reynolds), presented a one day workshop at

the Chesterfield County Utilities Department on February 5, 2002 entitled: "Laboratory Ethics and NELAC". The workshop was presented in an attempt to increase the environmental laboratory community's awareness of ethics related issues and to provide information on the National Environmental Laboratory Accreditation Conference (NELAC). The essential components of a laboratory ethics program were described, with the explanation that these could be adapted to suit the size and complexity of various laboratories. The presentations stressed the benefits of taking a proactive approach to avoiding problem situations, but also described the relevant criminal laws and legal consequences associated with unethical and fraudulent laboratory practices. In addition, the basic elements of NELAC were presented, including key standards required of laboratories for accreditation and how to propose changes to the standards. In attendance were over 30 laboratory managers, laboratory assessors, Quality Assurance Officers, analysts from the state of Virginia, and commercial and facility SDWA and NPDES laboratories.

152. Slayton, Joseph & Sosinski, Patricia. (1995, January). Region III Position Paper: Metals Data and Quality Control. Presented at the National Low Level Metals Workshop, Edison, NJ.

153. Slayton, Joseph, Wilson, M., Molnar, J., & Alvero, M. (1992). Recovery of Solvents Utilized in EPA Methods for Extractable Organics. In Pittsburgh Conference Presents PittCon '92. Pittsburgh: Pittsburgh Conference.

The EPA protocols for extractable organics (EPA Method 625 BNAs, EPA Method 608 pesticides/PCBs and additional Superfund specified semivolatile compounds) , in general, utilize significant quantities of methylene chloride and hexane. The great majority of these solvents are evaporated to the environment during the concentration process specified in this extraction methods (Kuderna-Danish step). This is of particular concern for chlorinated solvents such as methylene chloride, which may adversely affect human health as well as air quality. Methylene chloride was the focus of this research. In an effort to eliminate solvent emissions and to generate solvents for possible reuse (either within the laboratory or off-site), a solvent recovery system, utilizing specially designed condensers, was employed in the K-D step of the EPA extractable organics procedures. The system was evaluated for: the efficiency of solvent recovery; the potential affect upon the analytical results (accuracy and precision); and the practicality of use.

154. Sosinski, Patricia, Jones, J., Cunningham, W., & Stroube, W. (1984, September). ICP and NAA: Capabilities and Limitation for Elemental Analysis of Plant and Animal Tissue. Presented at the September 1984 Federation of Analytical Chemistry and Spectroscopic Societies (FACSS) National Convention.

155. Warner, Susan. (1997). Solid-Phase and Liquid/Liquid Extraction of Aqueous Samples. Presented at the Virginia Water Environment Association Technical Conference, Charlottesville, VA.

Water samples are commonly extracted using one of three different techniques: separatory funnel extraction, continuous liquid-liquid extraction and solid-phase extraction (SPE). The first two techniques are liquid-liquid extractions (LLE) which involve the extraction of compounds from an

aqueous sample into an organic solvent. The extract containing the target analytes is then concentrated and analyzed by various determinative methods. Separatory funnel extraction may produce problems with emulsions and is labor-intensive. Continuous liquid-liquid extraction automates the extraction of aqueous samples and produces fewer emulsions than the separatory funnel. Both liquid-liquid extraction methods use a considerable volume of solvent. Solid-phase extraction involves the use of a cartridge or disk. The solid sorbent is washed and conditioned and then the aqueous sample is introduced onto the sorbent. The analytes of interest are then eluted with an appropriate solvent. The extract is concentrated and is then ready to be analyzed by an appropriate determinative method. With solid-phase extraction, there are no emulsions formed and the volume of solvent used is relatively small. General principles, extraction procedures, applications to various types of environmental analyses and a listing of EPA approved methods will be discussed for each extraction technique.

156. Weisberg, Charles & Altman, Ronald. (1991, June). Labile Aluminum in Natural Waters; Analysis Methods and Evaluation. Poster session presented at LabTech '91, Atlantic City, NJ.

The paper compares a cation exchange separation procedure combined with graphite furnace atomic absorption spectroscopy (GFAA) to an ion chromatography (IC) procedure, for the determination of labile aluminum. Surface concentrations of dissolved labile aluminum, dissolved oxygen, sulfate, chloride, alkalinity, and pH were monitored at two locations on the Choptank River over two sampling seasons (1988-1989). Split samples were collected without aeration directly in 50 mL linear polyethylene syringes, through 45 micron syringe filters. All analyses for labile aluminum were performed within 48 hours of the sampling event.

157. Weisberg, Charles & Ellickson, Michael. (1996, June). Practical Applications of the U.S. EPA Method 8330 for the Analysis of Explosives by High Performance Liquid Chromatography (HPLC). In the 20th International Symposium on High Performance Liquid Phase Separations. San Francisco, CA.

The determination of explosives in environmental samples has become a frequent analytical request in recent times. This is primarily due to extensive remedial activities currently in progress at the numerous federal facilities slated for closing. In this report USEPA method 8330, an HPLC method for the analysis of target nitroaromatic and nitramine explosive compounds, will be evaluated for its practicality in the determination of environmental samples. The method describes procedures to extract and quantitate the target explosives in both solid and aqueous matrices. Prior to reversed phase HPLC analysis, solid samples are extracted by sonication for 18 hours with acetonitrile, while low-level aqueous samples require a liquid-liquid salting out extraction with sodium chloride and acetonitrile in order to pre-concentrate the target analytes. Generally, the method was found to perform acceptably. However, many method modifications needed to be employed in order to achieve proper analyte resolution, confirmation and desired quantitation limits. Some of the modifications reported in this paper include: nitrogen blow-down to adequately concentrate the final acetonitrile extracts after the salt in-out liquid-liquid extraction procedure; the use of an acetonitrile/water mobile phase for the cyano confirmatory column that differs from that specified by the method; reduced flow rates and methanol/water gradient elution for the C-18 primary column.

158. Weisberg, Charles & Ellickson, Michael. (1998). Modifications to SW-846 HPLC Methods 8330 and 8310. Proceedings: The 14th Annual Waste Testing and Quality Assurance Symposium (WTQA '98), 4.

159. Weisberg, Charles & Kovak, Brian. (1998, July). Reducing Methylene Chloride Exposures. Paper presented at the Safety, Health, and Environmental Management Program Management Workshop, Washington, D.C.

160. Weisberg, Charles & Kovak, Brian. (2002, January). U.S. Capitol Hill Anthrax Response. Presented at the U.S. EPA Hazardous Waste Operations and Emergency Response Workshop, Washington, D.C.

161. Weisberg, Charles & Kovak, Brian. (2002, March). EPA Safety and Health Programs at the U.S. Capitol Hill Anthrax Response. Presented at the Military District of Washington Safety Conference, Fort Myer, VA.

162. Weisberg, Charles & Kovak, Brian. (2002, March). EPA's Emergency Response, Operation Noble Eagle at the Pentagon . Presentation and Discussion Panel at the Military District of Washington Safety Conference, Fort Myer, VA.